

Permaculture Network In Malawi

Issue #46: Food Storage

July - August 2004

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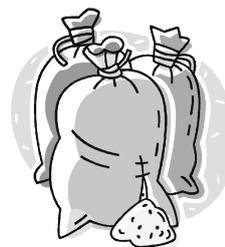
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Did I miss an Issue of the Permaculture Newsletter?

No! You did not miss an issue. We apologize, the newsletter editors were without a computer for the first half of the year and we are just getting up and running again, hopefully with a completely repaired computer! We will make sure that you still get your full membership's worth of newsletters!

Food Storage *From the editors*

In our last issue, we looked at the food security situation in Malawi and what we can all do to lessen or even eliminate the effects of the "hungry season". In this edition, we continue with that theme by examining the issues surrounding food storage. Proper food storage techniques can reduce hunger, increase food security, extend the harvest season of certain foods for months at a time, and contribute to household income if excess is sold!



Each year in Malawi tons of food is wasted due to the effects of improper food storage such as spoilage, animal/insect damage, and under-utilization. In a country faced with people complaining of hunger, anything that can be done to increase food security is a step in the right direction.

One of the best things that Permaculture principles can teach us about food storage to reduce the amount of food that needs to be stored. If a person is using Permaculture to meet their needs, they should have daily and year-round access to a wide variety of nutritious foods that are available in every season. This helps to eliminate the urgency of having to grow everything a person needs in a single rainy season. 🌍



Permaculture Newsletter Also Available Electronically!

We aim to keep the newsletter 'e-mail friendly' by using Microsoft word with limited pictures.

If you would like to receive the newsletter via e-mail to help save paper (and a tree!), please send an e-mail to the Newsletter Editors at:

Stacia & Kristof Nordin
nordin@eomw.net

My Food, Land, and Stomach *by Leo Kuwani*

Food preservation means how we can keep our food safely for our future use as to be food self-sufficient—sustainable at all times throughout the year. There are so many factors that can affect food preservation.

That is if food can be well cared for right away during the maturing or ripening period in the gardens or where they are being grown or reared against termites, weevils, or parasites, this can be the best start in food preservation.

Avoid overestimating the food during the maturing, ripening, or rearing stage. Avoid using it unnecessarily at this stage.

Do not exchange (keep) food with other products (e.g. maize with fish) as this will lead to low food preservation.

After harvesting, the food storage areas should be protected against the heat, bush fires, and avoid scratching the ground carelessly (such as sweeping excessively). That is, provide the land with the maximum support, groundcover, etc. as to enable the land to give us enough food supply throughout the year.

When crops have been harvested, this is also another important part which will lead me to have an empty or full stomach in the season. This can be done by following some of the natural pesticides/insecticides or parricide methods which our elders (ancestors) used:

- They sprinkled ashes on harvested pumpkins, dried beans, peas, cassava, and potatoes when it was ready to be put in granaries (nkhokwe), pots, or other grass or bark prepared containers. Some of these nkhokwes could be smeared to prevent and reduce the effects of insects and pests.
- They dug pits, spread ash, put in sweet potatoes, spread ash again and then covered (buried) the top of the pit for food preservation.
- Sun dried green leaves for vegetables, green maize, bananas, some other fruits, and mushrooms and sun or fire-dried some insects, animal meat, fish (in times when they were plentiful) and kept them in containers for future use.

The preserved food could be used anytime when there was need for such food and this meant sustainable and full stomachs all the year round. 🌍



Food Storage Tip: Natural Acetellic

One natural way of protecting your stored grains like maize (chimanga), sorghum (mapira), or millet (mawere) or legumes like lablab (khungudzu), kamumpanda, and beans (nyemba), etc. is to use the leaves of the Tephrosia plant. Take the leaves of the Tephrosia and dry them in the sun. When they become brittle and break easily, pound the leaves into a powder. Four to five matchbox-sided containers of this powder can be mixed into a 50-kg bag with your grain or legume/nut and help to protect it from weevils and other insect damage. Just as with other chemicals, be sure to clean the seed before eating it! 🌍

Congratulations to the Winners!

Pastor Joseph Chawawa & Leo Kuwani

In the last newsletter we asked members to describe how they use Permaculture principles to help find solutions to food security problems. Congratulations to the 2 top winners, each who will receive a training packet to help them continue to teach Permaculture principles to others. The following page highlights the work that the winners are doing.



Contest Winner! Pastor Joseph Chawawa, Box 40630, Lilongwe 4

above question is a very thought provoking question to every Malawian in this country of ours from South through Center to the Northern Region. It is indeed a very shameful thing to have a season of hunger in Malawi—yet we have good climate, much water (rivers and lakes throughout the year), good and rich agricultural land including dambos for dimba. The main reason why we have a hungry season in Malawi is because Malawians traditionally are used to growing and eating only maize and rice for many years. When we say that we are eating food, we mean only nsima and rice. When the climate does not favor these crops in that year—a severe shortage of “food”. Therefore, to answer the question, “What are you doing to end hunger or prevent the ‘hungry season’ in Malawi, and how am I helping to find solutions to food security problems and malnutrition?” I am doing the following practices:

- Perennial vines such as sweet potatoes, beans, and many others throughout the year.
- Perennial trees and shrubs such as cassava, sugar cane, pigeon pea, papaya, and banana.
- Fruit trees such as mangoes, guava, and citrus (oranges, lemons, and others).
- Natural and introduced woodland trees for firewood and many other uses.
- Vegetables and maize throughout the year as I am near a river.
- Keep small animals such as chickens, rabbits, and others.
- Raise fish in small ponds.

Therefore, because of these practices I and my family have something to eat during the hungry season. At this time I am eating cassava, bananas, sugarcane, green maize, pumpkins, and sweet potatoes. What I am lacking is the training of more knowledge in how to prepare food. 🌍

Contest Winner! Leo Kuwani, Box 54, Migowi

Vegetable Garden: I have an “open” vegetable garden—that is a low fenced area that each and every person can see what is happening or being done in the garden. I have sown seeds of tomatoes, cabbage, Chinese, rape, and eggplants. Made compost heaps, cleared the area and tilled it, mixed the compost with the tilled soil and made beds. When the seedlings are ready they are transplanted to the recommended spaces, and onions and carrots are planted in some of the beds with the seedlings. Some crops are intercropped with maize, beans, cucumber, potatoes, peas, pumpkins, cassava, okra, and repellent flower plants. The interplanting or companion planting is done as to maintain the maximum groundcover and to support each element as every element supports each other and reduces the grass germination. The repellent plants and flowers are planted as part of pest and insect management as to have natural pesticides. During the growing season, apart from using the watering cans, empty bottles are filled with rich manure diluted with water and are fixed close to the growing plants—this is drip irrigation. It makes the watering system easier for one can stay 2 to 3 days without using the watering can, but still the plants are getting maximum high support for their growth and production with low energy input. Through observation, the community come, see, and ask questions about this and that. They are learning and making their own “open” vegetable gardens, and they are appreciating as they are making themselves to be “mwana alirenji”.

Community Based Care: We have opened an “Orphan and Needy Children” based care, nursery school, two women’s groups, and one mixed group. We planted lemongrass, bananas, and vegetables. The children and the guardians are taking herbal teas, salads, and fruits using locally available resources. They admire the systems and are preparing for themselves.

Permaculture and Nutrition Design Courses: Have been and are conducting 3 to 6 day Permaculture and Nutrition Design Courses in Phalombe and Mulanje Districts, in activities relating to care of the earth, people, and the environment including: soil, water, energy, plants, animals, ecosystems, water harvesting, and pest management. The participants are practicing.

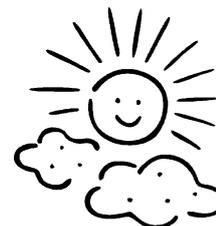
- Compost making to enrich the soil, keep worms as they assist on the farm.
- Nutrition—food preparation, selection in values, drying foods, and preservation.
- Growing various plants around our homes as to have sustainable living by growing them around the pit beds, raised beds, herbal beds, dug-less beds, planting guilds, using harvested water into the pit beds, swales, and building guilds.
- Some flowers planted around should be edible plants which can support the family throughout the year in the form of herbal drinks, foods, salads, and fruits supported by water from the kitchen and the roof—using every drop of water to the best usage to save labour, energy, and resources.
- The remains of the used seeds and materials can be recycled as not to waste resources and energy.
- Animals are integrated into the systems as every elements assists each other.
- Conserving nature by not cutting indigenous plants found growing in the gardens.
- We are sharing seeds, propagating, and sharing traditional herbal knowledge and its applications.

As a result of this, people are able to solve hunger-related problems for food in Malawi and not for sale hence we get rid of malnutrition, food security problems, or the “hungry season”. 🌍

Solar Drying: How does a Solar Dryer Work?

The following information is sourced from the Energy Related Technology web site www.ert.org.

Why use a Solar Dryer?: Any food or agricultural product with high moisture contents are easily attacked by insects and rot quite quickly. To guard against such possibilities and to preserve food for longer periods the food needs to be dried. The traditional method of drying is to spread the food openly in the sun. In this drying method, the food is often contaminated by dust and birds. A percentage is lost or damaged due to insects/birds.



What is a Solar Dryer?: A solar dryer is an enclosed unit, so the food is safe from damage, birds and insects. The food is dried using solar thermal energy in a cleaner and healthier way. This is a passive system of heating using only solar and wind energy to operate it. Solar dryers can be made in different sizes and shapes based on the quantity and type of food to be dried. The size and shape also depends on domestic or commercial use. A solar dryer can be used to dry a variety of agricultural products and food stuffs like: fruits, vegetables, grains, beans, spices, cash crops, fish, etc.



How a solar dryer works: Most solar dryers all work on the same principle. A container (wooden box, woven basket, or other) is made with a clear plastic or glass lid. Inside the container should be dark in colour (black is the best), and there should be two screened vents (one for letting cool air in and one for letting heated air out). Radiation from sunlight enters the container through the clear cover and is converted into heat energy raising the temperature inside. The heat energy is transferred to the food to be dried. The heated food gives out water vapour and dries up gradually. The heated moist air leaves the cabinet and dry air enters in a natural and conventional process. 🌍

Solar Dryers in Malawi

Adapted from an e-mail from Christa Roth, Advisor for Food Processing and Household Energy, Integrated Food Security Programme, P.O. Box 438, Mulanje, Malawi
Phone +265-1-466 279, Fax -466 435, messinger.roth@Africa-Online.net

Note from the Editors: This incredible project is in need of funding to continue its work. Please contact Ms. Roth if you know of someone ready to fund a truly innovative food security project!

Project Innovations for better drying of root and tuber crops

By analyzing the problems of the Makaka (mpasa or mat) method, the most important constraints are the conditions of the drying process (hygiene, temperature, duration) and the thickness of the particles. Two separate innovations were developed in order to overcome these shortfalls:

- 1) improved drying method: low-cost solar drier
- 2) improved processing method: grating with a simple household grater

Innovation (1): low cost "solar dryer"

Advantages of a dryer: Drying on the dryer instead of drying food items on the ground are:

Raised level: it is more hygienic (no disturbance by chickens, dogs, goats, children etc.) and it is more efficient (no moisture from the ground going through).

Black plastic: the 1.5m black plastic collects the heat (we measured up to 75°C on the black surface) hence drying is faster. By using a plastic layer, you do not lose as much material than with a bamboo or mat (it has no holes).

White plastic: optional addition, dryer works as well without it. On clear days, drying without clear plastic is faster. On days with a lot of wind or little showers, the clear plastic protects the drying material and prevents the heat to move away from the dryer.

or, NO Plastic! The dryer can be used without plastic at all (then use a mat or clean cloth to cover the table where your food items are laid out), only with black plastic (then the dryer can be longer) or with both black and clear plastic.

(Solar Dryers in Malawi, Integrated Food Security Project, Cont.)

Recommended dimensions of a dryer:

- Height:** about 1 m to be a comfortable working height, high enough to be safe of children and animals
- Width:** about 2 m as the greenhouse and black plastic usually are available in a standard width of 2 m. If no clear plastic is used as a cover, the dryer can be longer.
- Depth:** about 1.5 m (= two arm-lengths, as all parts of the dryer table should be easily accessible)
- Length:** Any! Some people have made them 10 m long!

Recommended location of a dryer and the timing of drying:

The dryer should be constructed on the house plot for safe-guarding. It is of advantage to find a place where a lot of full sunshine (preferably between morning and midday) can reach the drying material. The early morning hours (from 7 to 11) are most efficient, as later on the moisture in the air builds up and the intensity of radiation from the sun decreases. We have loaded on a surface of 3 sq m (1.5x2m) up to 5 kg grated fresh cassava. The capacity depends on how fine the material is grated (size of the grates). The drying took less than two hours on a clear day. In this case the dryer can be loaded several times a day.

The important thing is that the drying material is not loaded too densely so that there is always some black plastic still to be seen, as the black plastic acts as a heat trap. This of course can only work if patches of black plastic are exposed directly to the sun. Otherwise (= material to dry is covering the whole drying rack) there is no difference of using the black plastic and the use of a 'mpasa' or any other material.

Intervention (2): low cost grater: Cutting, slicing, grating – there are many ways to create smaller pieces of sweet potato tubers and cassava roots. There are many good reasons for and against each one of them. IFSP opted for using grating with individual household graters:

- Smaller pieces dry faster;
- Smaller pieces do not weevil as fast as thick pieces when stored; weevils always need somewhere 'to hide inside' so bigger pieces are more attractive to weevils than fine grates or thin slices;
- For bitter cassava, the reduction of the cyanide content in the drying process is closely related to the thickness of the cassava pieces. Thinner pieces lead to higher reduction rates of cyanide.

Cutting: The cutting with a knife is much faster, but it provides pieces that are too thick and of unequal dimensions. Therefore it is very difficult to determine the final point of drying.

Slicing: Slices can be very thin, but they tend to stick together because of the sticky characteristic of starch. Hence you produce thin pieces which on the drying rack still form thick lumps that dry irregularly.

Grating: It takes more time and labor to grate the same amount of cassava or sweet potato than any of the other methods. But the benefit is, that it dries much quicker and homogeneously. On very sunny days, you can load the dryer 2 or 3 times per day. 🌍

** Note from Editors: Peace Corps Volunteers in Zambia were also using this method for solar drying but using cloth tied right to the tandala - give it a try for all your food drying needs!



Step 1: Making the structure, similar to a local Tandala in Malawi



Step 2: Adding the plastic (or cloth) to protect the food from dust.



The grater on the left is made by a local tinsmith, the right one was imported from South Africa. After processing of about 1.000 kg of fresh cassava it was worn out.

How to Solar Dry Fruit

The following information on Solar Drying of Food is taken from a pamphlet put out by SADC-ICRAF AF Project and prepared by Alexandra Schomburg:

Fresh fruits are an essential part of a healthy, daily diet. Mangos, avocados, guavas, tangerines, oranges, peaches, mulberries, bananas, and a number of wild fruits grow in abundance in many areas of Malawi during certain times of the year. In fact, like mangos, come in excess when in season. The only way to ensure that these fruits do not go to waste and may be enjoyed for longer periods of time during the year is to preserve and process them when in season. Almost any fruit can be dried.

Best drying results are obtained with locally made solar dryers as they produce uncontaminated, good quality food in a short time. They also prevent losses due to insects, rodents, chickens, and other birds. They provide safe products with a shelf-life of approximately 6 months, depending on the type of fruit, the dry matter of the fruit, the packaging, and the storage after processing.

Fruit Selection:

- Fruits which are overripe, attacked by mould, spoiled by insects, or physically damaged in any way should be separated. If this is not done, healthy fruit from the harvest will easily become contaminated and will also spoil.
- All fruit must be thoroughly washed with clean water before peeling. Freshly harvested fruits may carry a lot of dust and micro organisms on the outer surface, causing diarrhoea or stomach pains when not removed before processing.



Peeling and Cutting:

- Peeled fruit can be sliced or cut into pieces, but the diameter should not exceed the thickness of two fingers (about 4cm). This width varies from fruit to fruit: mangos, papayas, and guavas dry best when cut into finger-thick slices/pieces (about 1-2 cm) while banana slices can have diameters of up to 4 cm.
- Fruits like pineapples, mangoes and papayas can be pre-treated with a sugar solution to soften them and to help them keep their colour and flavour. To make the sugar solution, mix 3 kg of sugar in 10 litres of clean water and dip the sliced fruit into the solution for 5-10 minutes.
- Fruits like bananas, avocados and apples should be dipped into a mixture of 2 litres of lemon juice to 10 litres of clean water. The fruit slices or pieces should remain in the solution for no less than 15 minutes.

Drying:

- After the pre-treatment, the fruit slices can now be placed on the trays. There has to be a small distance between the slices. Never heap them, as that will lead to improper drying.
 - The trays should then be placed into the dryer.
 - The produce needs to be checked for its readiness after 6-8 hours depending on the fruit that is processed, the thickness of the slices, the weather conditions and the expected end product. The thicker the slices, the longer the drying process. The less sunshine, the longer the drying process.
 - In case you want to grind your dry fruit (e.g. banana, avocado), it will require about two additional days to dry the fruit. Some fruits might require 6 hours, while others need to be dried for another day. The best idea is to check the fruit in the dryer frequently, when you dry them for the first time.
- Note: The fruit should not be sticky after having been dried! If this is the case, they need further drying.

Storing Dried Fruit:

- Most dried fruits tend to absorb moisture from the environment. To avoid this, it is necessary to pack the produce into airtight packaging material immediately after drying. This includes plastic bags that are sealed, airtight jars, or boxes.
- The dried fruit can be kept in a clean, cool, dark storage area for at least six months.

Enjoy your dried fruit! 🌍

Storing Cooked Beans!

A Peace Corps Volunteer was struggling with the fact that he always cooked too many beans to eat in one day, so he tried putting the cooked beans in his solar dryer. Once the beans had dried out, he was able to store them until a later time and they cooked again in minutes!

YOU could be highlighted here!

Write to the Newsletter Editors describing how you integrate Permaculture and Nutrition into your life and/or work! Include a photo of your work if you have one.

Additional Ideas on Food Storage: Jams and Pickling

Jams: (From Malawi's Traditional and Modern Cooking Book)

- Choose firm fruit, discard any brown parts. Wash, peel, and deseed the fruit. Cut into small pieces. Cut roughly. Put the cut up fruit into the pan, cover with water.
- Leave to stand for a few hours or overnight if possible to extract the juice from the fruit.
- Bring to a boil and cook gently till the fruit is tender. Measure by cupfuls the fruit and liquor.
- To each cupful add 1 cup of sugar and the juice of ½ lemon. If there is time to leave the pan overnight, the jam will set better and have better flavour.
- Stir the jam over a gentle heat till the sugar is dissolved then bring to a fast boil and continue boiling, uncovered, on the fastest boil possible until the jam is set. To test for setting, stir the jam well, then let the last drop from the spoon fall on a cold plate. As it cools, push the drop gently with a finger. If it crinkles, setting point is reached.
- Set the pan aside to cool slightly, to prevent the fruit from rising in the jam as it cools.
- Bottle in clean hot jars, cover with an airtight layer of thin plastic, cut from a clean sugar bag perhaps, or a layer of candle wax, then seal the bottles. Cool, wipe the bottles clean, label them and store in a cool place. If jams are made as a small scale income generating activity, ask the customers to bring their own clean containers and sell them the jam by the cupful. This keeps costs down when food containers are not readily available.

Pickling:

Rule number one in pickling: Everything you use MUST be clean – your hands, all the fresh foods you choose should be washed, any utensils need to be clean, and the containers that you are going to put the pickled foods into should be cleaned very well. First, prepare the foods which you would like to pickle, this example is for pickled eggs:

- 2 Onions sliced
- 12 Hard boiled eggs, after they are boiled, peel them

Or, many other items can be pickled. Get creative! Okra, Mangoes, Peppers, Cucumbers, Local fruits & vegetables, etc. There can even be a mixture of different foods in one jar.

Pickling ingredients:		Spices:	
You <u>must</u> use these ingredients in these amounts:		Any Spices may be used – get creative:	
2 cups	Vinegar	2 Tablespoons	Mustard
½ cup	Water	1 T	Celery seed
1 cup	Sugar	1 T	Mustard seed
1 Tablespoon	Salt	6	Whole cloves

Instructions for making the pickling mixture:

1. In a saucepan, blend a little mustard (or other powdered spices) with the vinegar to make mixing easier, then blend all the remaining **pickling ingredients** and **spices** that you want.
2. Cover the saucepan and bring to a boil.
3. Simmer for 10 minutes.
4. Remove the pickling mixture from the heat and allow it to cool before pouring over the items which are to be pickled.
5. Allow the pickled food to sit for a few weeks before eating so that the flavours mix well with the food, if done properly, pickled foods can last for many months.



Permaculture Newsletter

Newsletter Editors
Kristof & Stacia Nordin,
PO Box 208, Lilongwe

*“See the world through
the eyes of Permaculture”*

To:

The rains are coming! Is your soil well-fed and healthy and ready to drink up all the water?

Join the Permaculture Network!

- 🌍 **Benefits** include quarterly newsletters with advice on implementing Permaculture, improving nutrition, local food & medicinal plants, resources, creative ideas, and contacts of people in Malawi who are also practicing the sustainable living of Permaculture.
- 🌍 **Fees** are 400 mk for the calendar year. Those who pay more can sponsor community groups who are unable to afford the fees (thank you!).
- 🌍 **Memberships** are for the calendar year. If your mailing label includes **“Payment Due!”** Please send your 2004 membership fee or a letter stating why you are unable to pay the fee and why you would like to receive it for free.
- 🌍 **Send** payment in the form of check, postal order or Malawian postal stamps along with your name, address, all contact details, profession & areas of interest with checks written and addressed to: **Stacia Nordin, PO Box 208, LL**

Submissions to the Newsletter

Each Permaculture Network Newsletter has the sections: Permaculture Highlight, Resources & Member News. The other articles are based on a theme that is always posted in the previous issue so that you can prepare articles along the theme. We welcome submissions for any section and would love to see articles from new people! Send your submissions to:

Newsletter Editors, Stacia & Kristof Nordin, nordin@eomw.net or c/o PO Box 208, Lilongwe

Next Issue: Review of Permaculture & Network Updates